Idaho State Department of Agriculture
Division of Agricultural Resources

# Results of Herbicide Testing of Idaho Ground Water in Agricultural Areas with Limited Historical Testing

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## Introduction

In 2004, the Idaho State Department of Agriculture (ISDA) Ground Water Program was awarded a grant by the Environmental Protection Agency (EPA) to test ground water for herbicides in areas of the state having little or no previous herbicide testing. The grant provided resources to conduct initial testing of 49 domestic wells in 11 counties across the state (Figure 1). The testing was undertaken to develop a better understanding of water quality related to pesticides in these areas.

Subsequent testing in March of 2005 of 11 additional sites in Franklin County was completed as a follow-up to an atrazine detection of 0.67 µg/l from the initial testing. The concentration of the detection required additional action to evaluate the degree and extent of atrazine contamination as detailed by the Idaho Pesticide Management Plan (ISDA, 2004). The concentrations and extent of contamination also have the potential for future regulatory action as the Rules Governing Pesticide Management Plans For Ground Water Protection (IDAPA 02.03.01) come into effect July 1, 2005. Remaining funds from the original EPA grant as well as ISDA Ground Water Program operating funds were used to fund the follow-up testing.

Water samples were collected at each site in 2004 and 2005 monitoring to run EPA analytical method 300.0 for several inorganic compounds. The primary reason for this analysis was to evaluate nitrate impacts at each location due to known nitrate contamination problems in the state. ISDA Ground Water Program operating funds were used to fund this testing. Results of this testing are beyond the scope of this document and will be presented in a future report.

## Background

ISDA is responsible for a variety of programs, laws, and rules for protection of ground water from pesticides. The division of Agricultural Resources has a

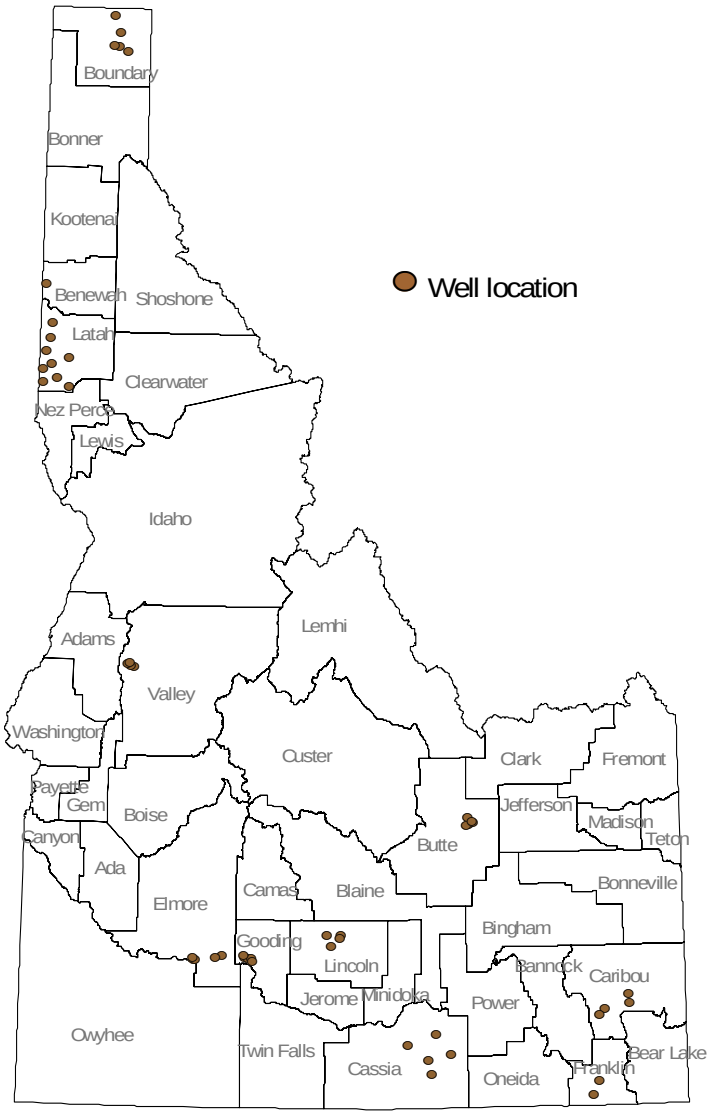


**Figure 1.** Locations of 49 ground water wells tested for pesticides in 2004.

Cooperative Agreement with EPA to implement the EPA Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). ISDA staff implements Idaho Pesticide Laws and Rules to implement FIFRA. ISDA staff conduct monitoring duties to fulfill this cooperative agreement. Additionally, the Idaho Pesticide

Management Plan (PMP) and Rules Governing Pesticide Management Plans For Ground Water Protection require state response to detections in Idaho ground water. The state response as outlined in these two documents is based on four distinct levels established by pesticide detection concentrations as they relate to a percentage of a reference point (health standard). Each higher level requires additional and more stringent action by ISDA.

Since the 1990's, the ISDA Ground Water Program has conducted pesticide testing through local and regional-scale ground water monitoring in agricultural areas of the state. Regional projects have been established primarily through review of Idaho Department of Water Resources (IDWR) Statewide Program monitoring. Local monitoring has been established through regional monitoring detections, public complaints, and as a results of interagency requests. Although these monitoring activities cover many areas of the state, geographic gaps related to pesticide testing in Idaho still exist providing the impetus for requesting the grant to fund the monitoring activity described in this report.

## Methods

Well sites for ground water pesticide testing were selected based on a geographic review of existing pesticide data in IDWR and ISDA databases. Existing ground water quality data were overlain on landuse data using ArcView® and visually evaluated. Agricultural areas showing no ground water pesticide testing or having large spatial gaps between data were selected for testing. Permission was gained from the land owners prior to sampling. Grant funds provided the resources for covering many of these areas, however, some areas remain untested and will be slated for future monitoring activities.

All sample collections followed established ISDA ground water monitoring standard operating procedures (on file at the ISDA main office) for sampling, handling, storage, and shipping of pesticide water samples. Analysis of samples was completed by the University of Idaho Analytical Sciences Laboratory (UIASL) strictly following federal Good Laboratory Practices. UIASL used liquid chromatography/mass spectrometry analysis for pesticides utilizing EPA Methods 507, 508, and 515.1. Testing included pesticide analysis for 120 different herbicide compounds known to be used in Idaho. Duplicates, splits, and matrix spikes/matrix spike duplicates were collected and submitted following ISDA ground Water Program protocols.

## Results

### Pesticides (2004)

Forty nine wells were sampled between late June and late August in 2004 (Figure 1). Of the forty nine wells tested, six wells (12%) had positive detections of seven distinct herbicide compounds (Figure 2 and Table 1). The most significant detection in terms of health

**Table 1.** Table of pesticide detections with concentrations, health reference point , and county of detection.

| Pesticide | Quantity | Reference Point (µg/L) | County of Detection |
|---|---|---|---|
| 2,4-D | 0.13 | 70 (MCL)[1] | Elmore |
| Atrazine | 0.67 | 3 (MCL) | Franklin |
| Bentazon | 2.9 | 200 (HAL)[2] | Latah |
| Dacthal (DCPA) | 0.18 | 70 (HAL) | Elmore |
| Desethyl Atrazine | 0.44 | -------[3] | Franklin |
| EPTC | 0.13 | 175 (RfD)[4] | Butte |
| Picloram | 0.35 | 500 | Boundary |

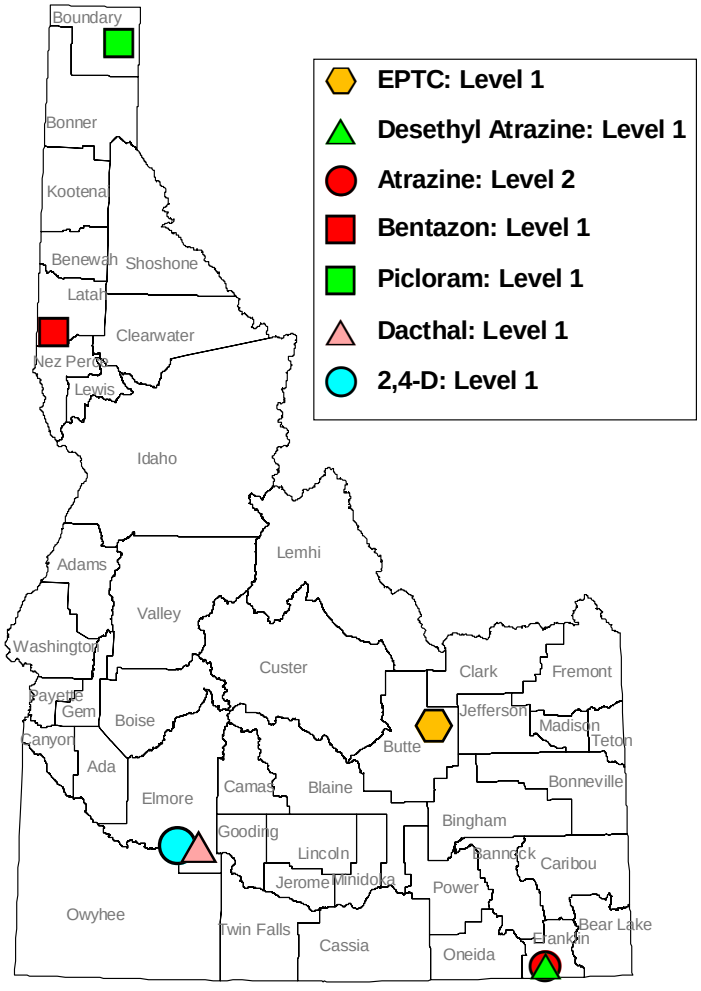


**Figure 2.** Map of positive pesticide detections with legend of constituents and PMP response level.

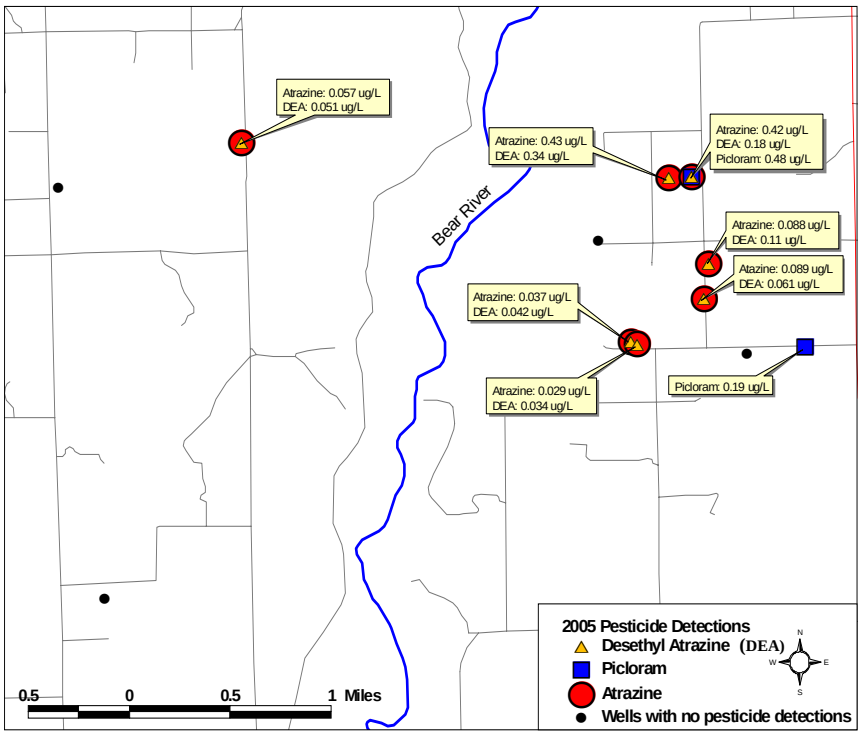


**Figure 3.** Map of positive pesticide detections from 2005 follow-up testing in Franklin County.

concerns occurred in Franklin County in southeast Idaho (Figure 2). The detection was of the herbicide atrazine (0.67 µg/L) at 22% of the maximum contaminant level of 3 µg/L. This detection falls within the level 2 category of the PMP requiring additional and more stringent action by ISDA. The well also had the atrazine breakdown product of desethyl atrazine at a level of 0.44 µg/L.

### Pesticides Follow-up (2005)

Pesticide testing at 12 sites in Franklin County including the well having an atrazine detection of 0.67 µg/L was completed in March of 2005 (Figure 3). Results showed multiple wells having atrazine and desethyl atrazine detections in the area. All atrazine detection concentrations fell within the level 1 category of the PMP. The original level 2 site showed a reduced concentration of atrazine of 0.43 µg/L and desethyl atrazine at 0.34 µg/L. In addition, picloram was detected at two sites.

## Conclusions

Results of testing indicate that some areas of the state with limited historical testing do have pesticides in ground water. Twelve percent (6 wells) of the original 49 wells tested had one or more positive detections for pesticides. One detection in Franklin County was at a level two requiring potential further action. Follow-up testing of the Franklin County area indicated that atrazine could be found in a widespread area at level 1 concentrations. This project proved useful in locating areas with pesticides in ground water.

## Recommendations

ISDA personnel will continue to stress the importance to pesticide applicators to adhere to label requirements and to apply all pesticides according to federal and state laws. ISDA will continue to educate applicators in these efforts.

ISDA Water Program staff recommend similar projects in the future to help identify areas of concern. Areas with little historical testing for pesticides still exist within the state of Idaho.

## Acknowlgements

ISDA Water Program staff thank EPA Region 10 for providing funding for this special sampling project. Also, we would like to thank the homeowners who allowed us permissions to access and sample their well.

## References

Idaho Pesticide Management Plan (draft), 2004. Idaho State Department of Agriculture. 2270 Old Penitentiary Road, Boise, ID 83712